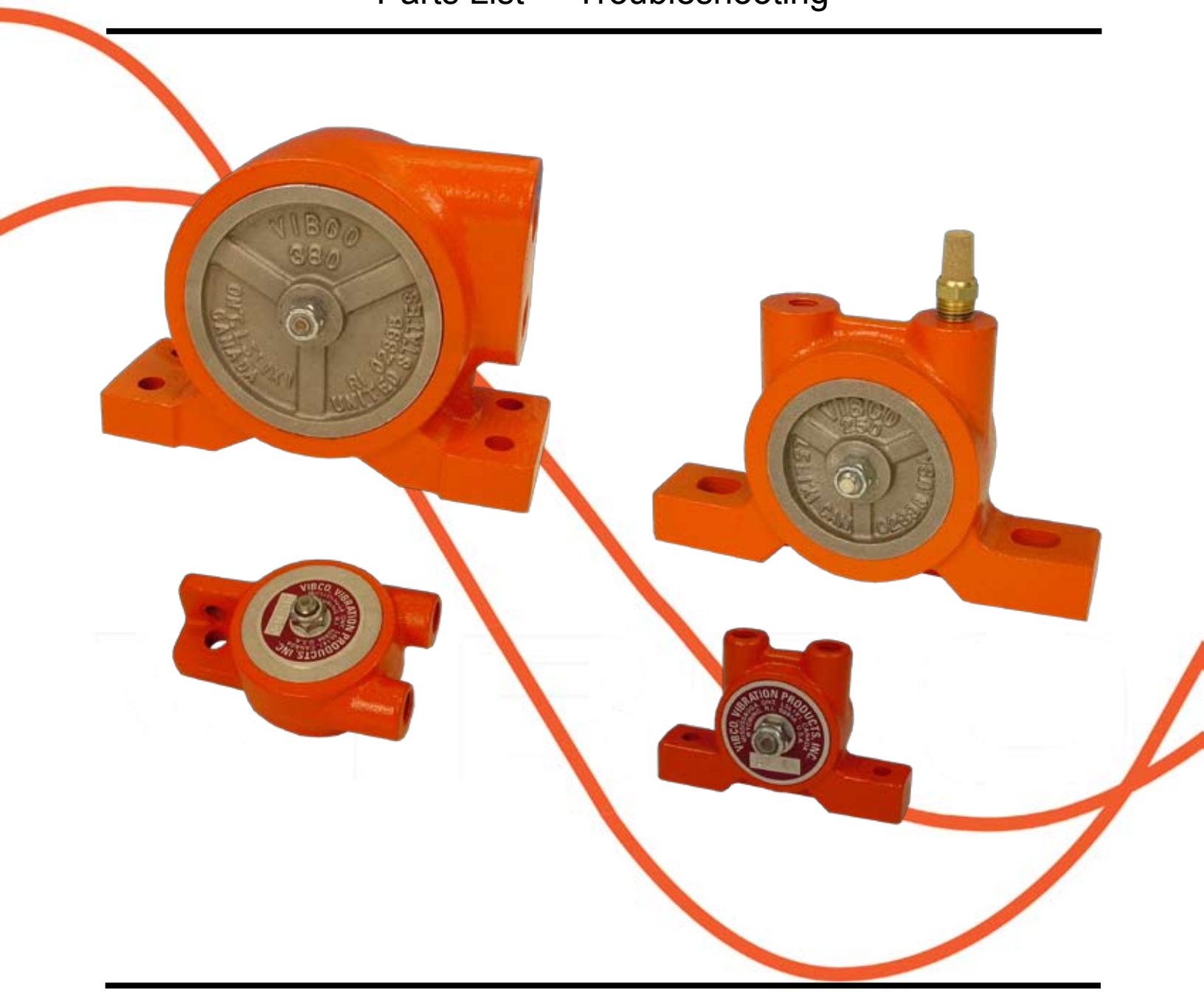
Pneumatic Ball

Mounting Instructions • Operating Instructions •Technical Data
Parts List • Troubleshooting



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Thank you for choosing VIBCO, Inc. for your vibration needs. You are now the owner of the finest pneumatic piston vibrator available today, backed by complete manufacturer confidence in its quality and dependability. For reference, please complete the information below about your new VIBCO vibrator.

Model Number: _____

Date of Purchase: _____

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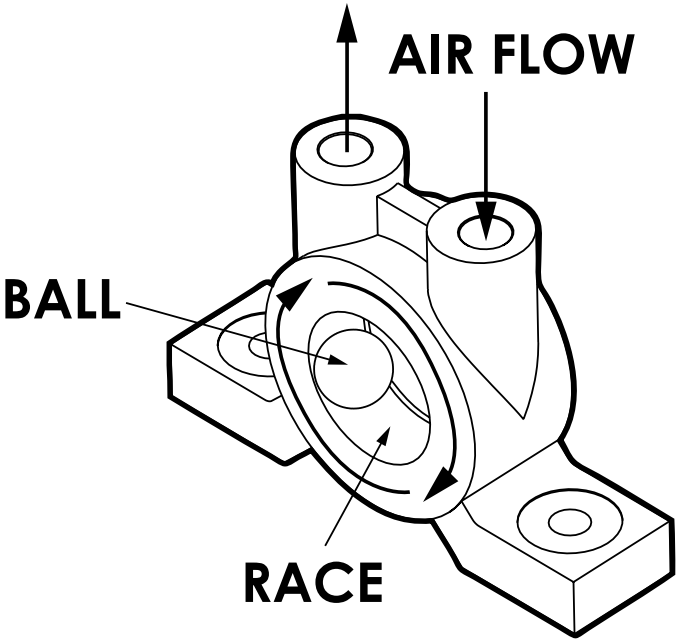
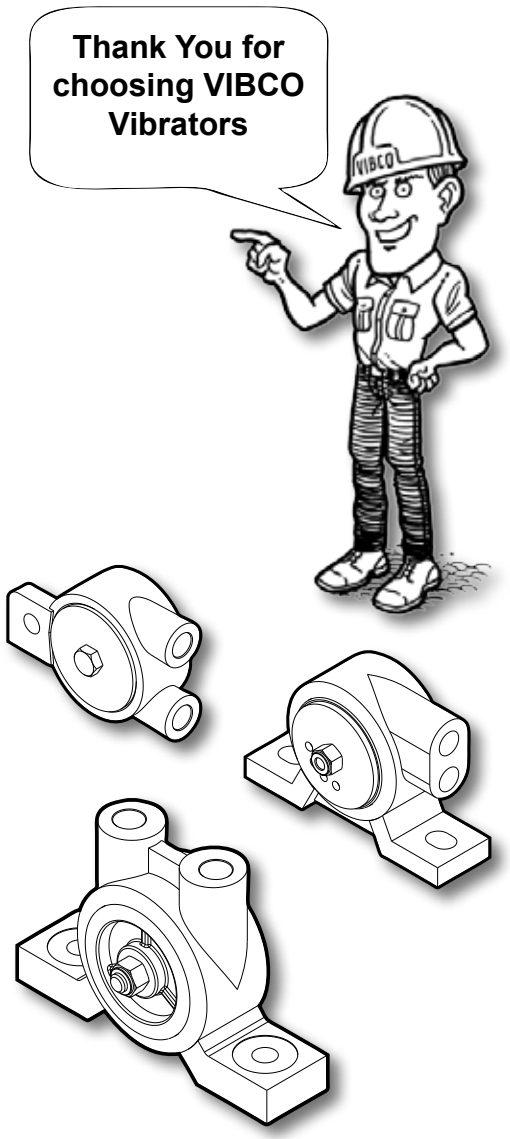
SAFETY INSTRUCTIONS

WARNING: Failure to read and follow these installation instructions and safety precautions could result in personal injury, equipment damage, shortened service life or unsatisfactory equipment performance. All information in this document is vital to the proper installation and operation of the equipment. It is important that all personnel who will be coming in contact with this product thoroughly read and understand this manual.

HOW IT WORKS

Your new VIBCO pneumatic ball vibrator uses compressed air to drive a hardened steel ball at high speeds around a ground and polished race, creating high frequency vibration. The use of o-rings has been eliminated in order to allow each unit to be used in environments where temperatures can reach up to 350º F. The movement of the steel ball in the vibrator is controllable by regulating the incoming applied air pressure or adjusting the muffler.





Optional Features:
VIBCO pneumatic ball vibrators are available in many different configurations. Your ball vibrator can be custom made to include features that will accommodate environments where absolute cleanliness is desired. All models are equipped with an exhaust port to lead away the exhausted air from areas where cleanliness is a must Contact VIBCO if you would like more information.

MOUNTING INSTRUCTION CHECKLIST

Warranty is void if vibrator is not properly installed. During installation follow and check off the following steps and your vibrator should provide you with years of trouble-free service.

- □ Determine the length of the channel iron.
- □ Select thickness of vibrator mounting plate and method of mounting.
- □ **STITCH** weld mounting plate to channel iron.
- □ Determine where vibrator should be placed on the bin.
- □ **STITCH** weld channel iron to bin.
- □ Place vibrator on mounting plate. It is important that you check the mounting plate for any warping. Secure vibrator firmly.
- □ Install safety chain or wire.
- □ Connecting pneumatics.
- □ Continuous vs. intermittent operation.
- □ ***FILL OUT WARRANTY CARD!!!***

MOUNTING INSTRUCTIONS

Mounting Plate

For force up to 100 lbs. use a 1/4 in. thick plate, 100 to 500 lbs. use a 3/8 in. to 1/2 in. thick plate and over 500 lbs. use a 1/2 in. thick plate. (See Table).

CORRECT MOUNTING PLATES	
LBS. OF FORCE	PLATE THICKNESS
up to 100 lbs.	1/4" plate
100 to 500 lbs.	3/8" to 1/2" plate
over 500 lbs.	1/2" plate

Mounting Channel

Never place the vibrator directly onto the skin of the bin. It should be mounted to a plate and piece of channel iron that has been welded to the bin. The proper mounting method is to use either 3 in. or 4 in. channel iron. This will help to stiffen the structure to be vibrated as well as spread the vibration over a larger surface, increasing the overall efficiency and diminishing the possibilities of fatigue cracks in the bin material.

VIBRATOR FORCE in LBS	MNTNG PLATE THICKNESS	CHANNEL IRON SIZE	FACTOR A
101 - 500	1/4" - 3/8"	3" x 4.1 lbs 3" x 5 lbs	2
501- 1200	1/2"	4" x 5.4 lbs 4" x 7.5 lbs	3

BIN WALL THICKNESS	FACTOR B
1/8" (10 ga.) or less	6
1/8" - 1/4"	5
1/4" - 3/8"	4
3/8" - 1/2"	3
1/2" & up	2

FACTOR A + B	USE CH. IRON LENGTH
9	5 - 7 FT. (70 -80%)
8	4 - 6 FT. (60 - 70%)
7	3 - 5 FT. (50 - 60%)
6	2 - 4 FT. (50 - 60%)
5	1 - 2 FT. (50 - 60%)
4	N/A

1. Longer channel iron will not affect vibrator performance, but total channel length should not exceed length of bin wall.

2. Percentages shown indicate % of bin wall height your channel iron should be for shorter bins.

3. To match your vibrator on chart above, model number suffixes generally correspond to pounds of force generated. For any questions, consult VIBCO.

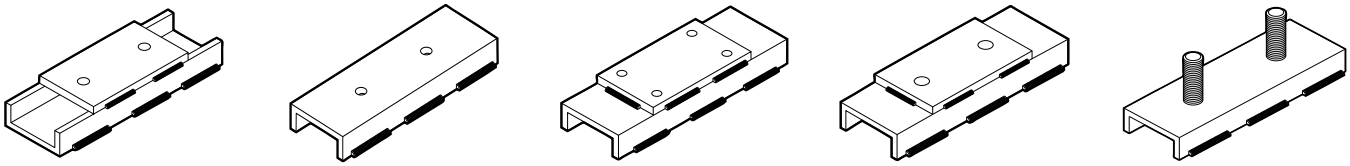
Welding Mounting Plate to Channel Iron

Weld the mounting plate to the middle of the channel iron. If the bin plate is 3/16 in. or less, weld the mounting plate to the back of the channel iron (see figure 3 or 4). If the bin plate is over 3/16 in. weld the mounting plate to the legs of the channel iron (see figure 1). Drill and tap holes or use studded plate (see figure 1).Make sure the mounting plate does not warp or distort. If this occurs, straighten, replace it or shim up vibrator.

Different Suggestions for Mounting the Channel

1. Mounting plate welded to legs of channel iron.
2. Channel iron with holes drilled thru and nuts welded on back side, or just holes drilled thru.
3. Add mounting plate and drill and tap holes thru.
4. Weld studs to back of channel.

Always stop welds 1 in. from ends to prevent cracks.



1 2 3a 3b 4

NOTE: for a list of alternate and special application brackets, see pg. 35 of the VIBCO General Catalog.

Placement

For coarse materials the vibrator should be mounted approximately 1/3 of the distance from the discharge opening to the top of the sloped portion of the bin. For fine grain materials place the vibrator approximately 1/4 of the same distance (see different mounting suggestions on the following pages).

Welding Channel Iron To Bin

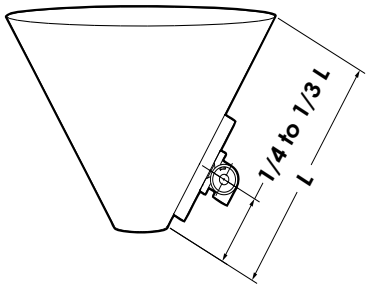
Where possible the mounting plate on the channel iron should be placed 1/3 to 1/4 of the distance from the discharge opening to the top of the sloped portion of the bin. Stitch weld channel iron in place, then weld intermittent welds 3 to 6” long with 3” between them along the entire length of the channel. Stop weld a minimum of 1” from the ends, it is important that you do not weld the ends of the channel iron. The heat concentration when welding the ends could cause the beginning of fatigue cracks.

Installing Safety Chain

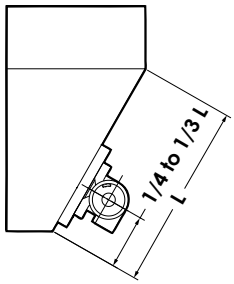
It is important to install a safety chain or wire in order to prevent the vibrator from falling and potentially causing injury if it comes loose from its mount.

MOUNTING SUGGESTIONS

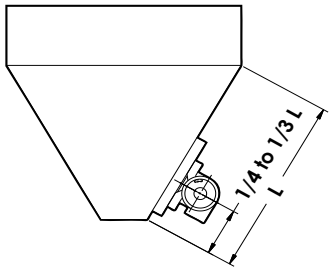
Conical Bin



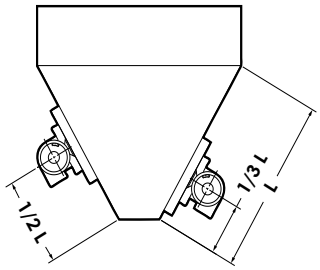
1/2 Rectangular Bin



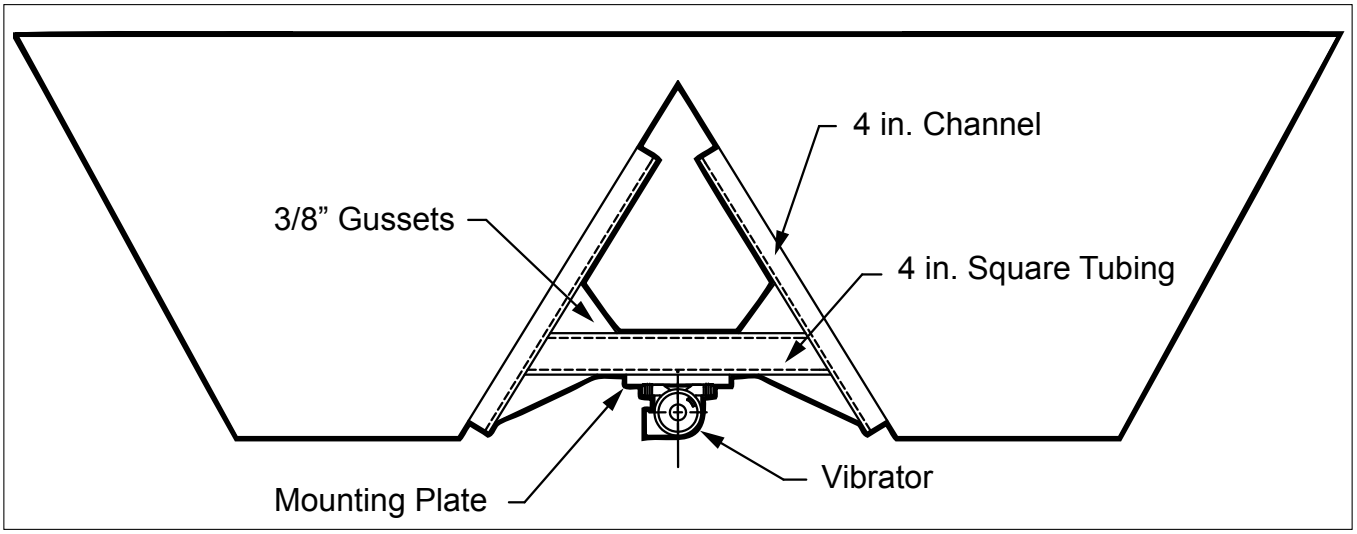
Rectangular Bin



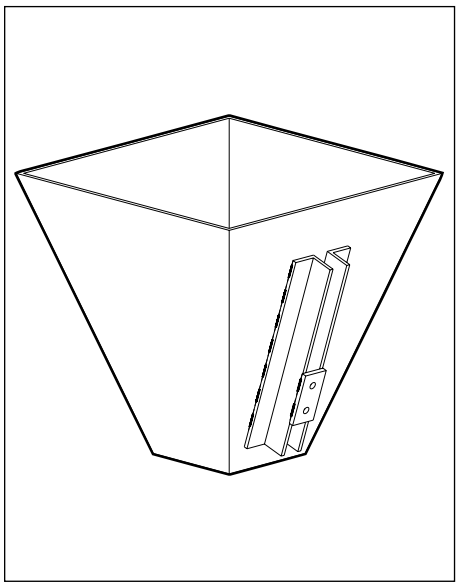
Two Vibrators On A Single Bin



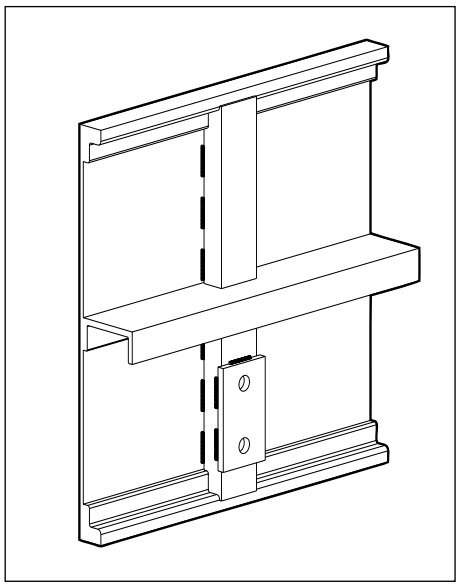
One Vibrator for a Double Bin



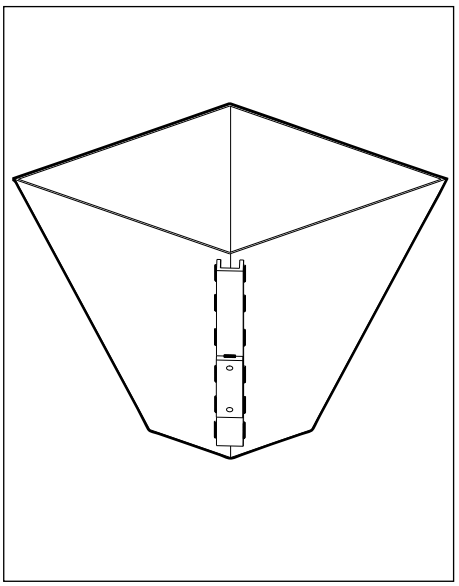
Angle Iron Stiffeners Instead of Channel Iron



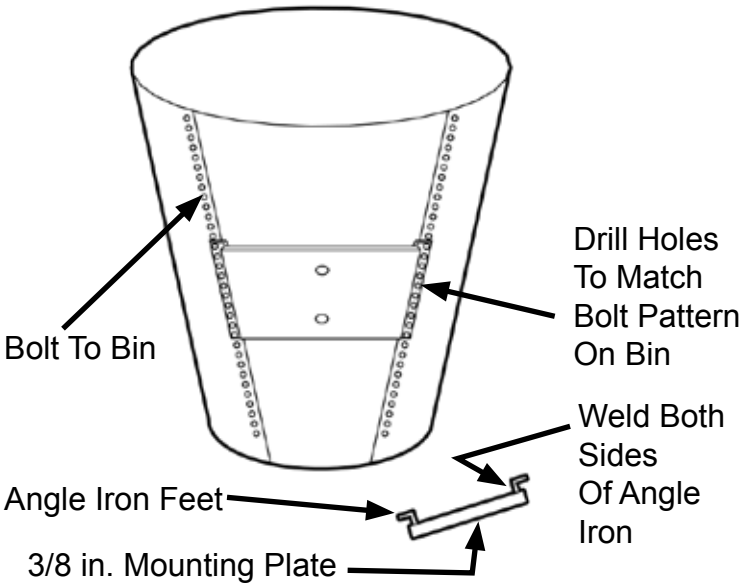
Bin with Stiffeners



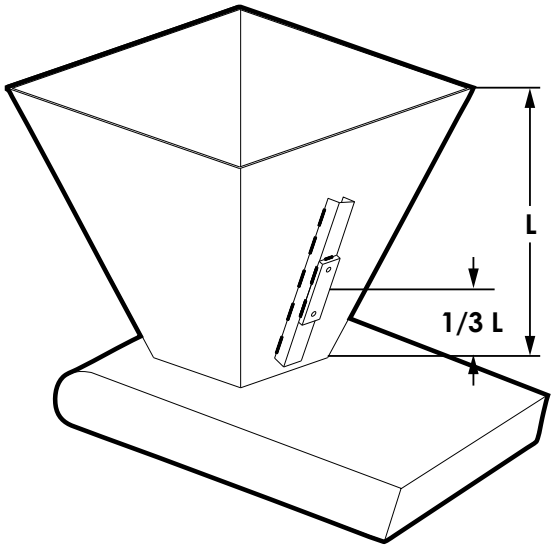
Thin Skinned Bin Corner Mount



Sheet Metal Bin

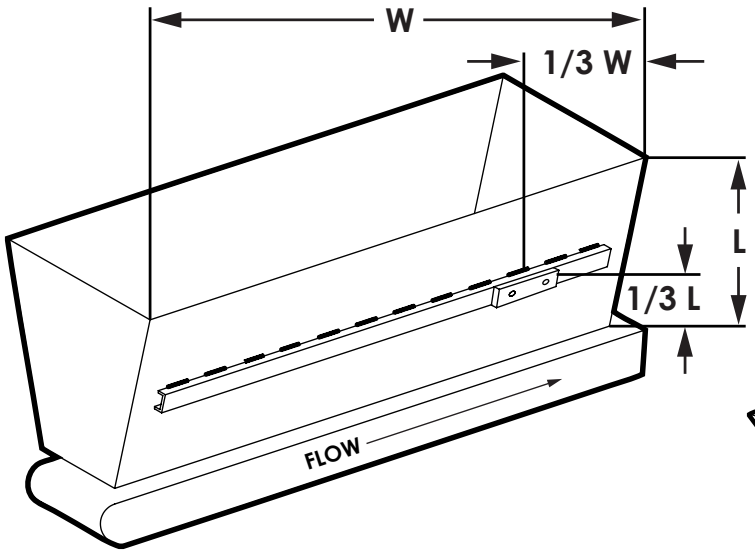


Belt Conveyor & Standard Bin

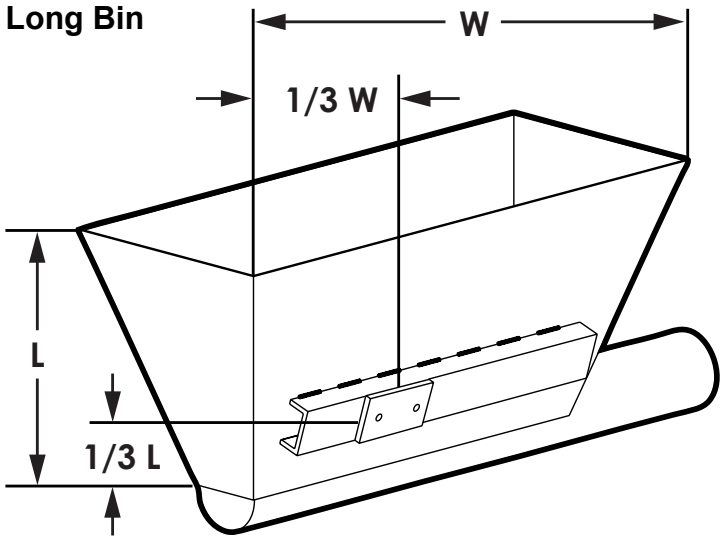


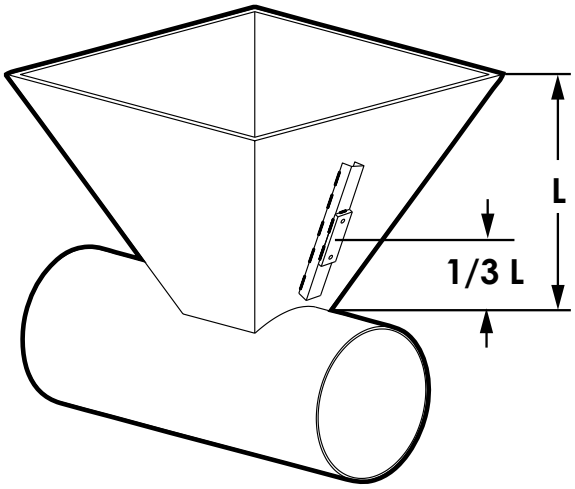
Belt Conveyors

Belt conveyor feeds from the front. Vibrator should be placed 1/3 from the front. If 2 vibrators are used, place second one directly opposite 1/3 from the back. Do not operate back vibrator until bin is empty in front and the front vibrator has turned off. For more details, consult VIBCO.



Long Bin

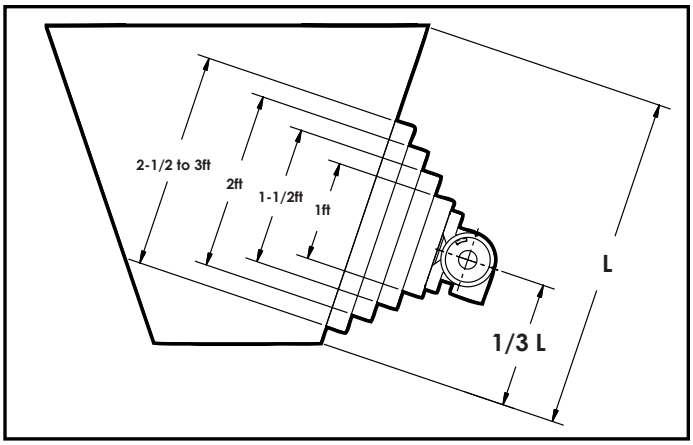


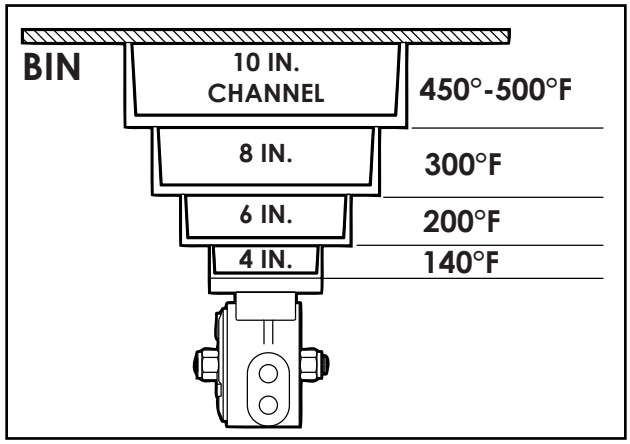


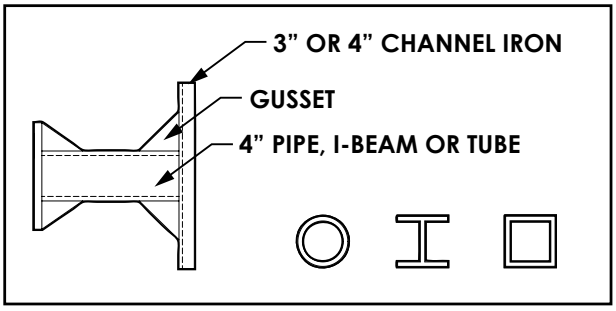
Screw Conveyors

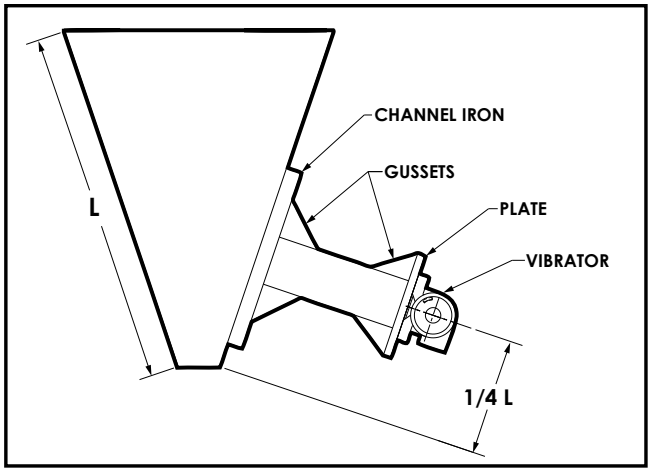
Feeds from back. Vibrator should be placed 1/3 from the back. If 2 vibrators are used, place 2nd one directly opposite 1/3 from the front. Do not operate front vibrator until bin is empty in back and the back vibrator has turned off. For more details, consult VIBCO.

Heat Mounts for Insulated Bins Containing High Temperature Materials: When materials in the bin have a temperature over 150°F, it is advisable to use a "heat" mount to prevent excessive heat from reaching the vibrator and causing overload or bearing failure. Also, ask for "high" temperature grease in vibrator bearing. Consult VIBCO for vibrator size.



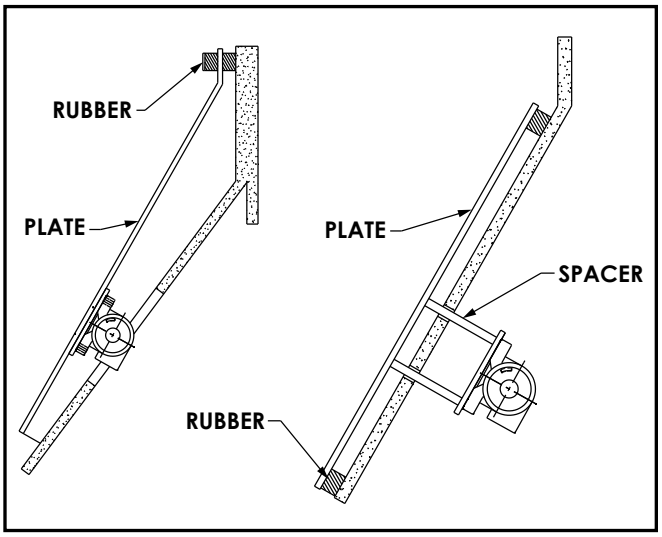


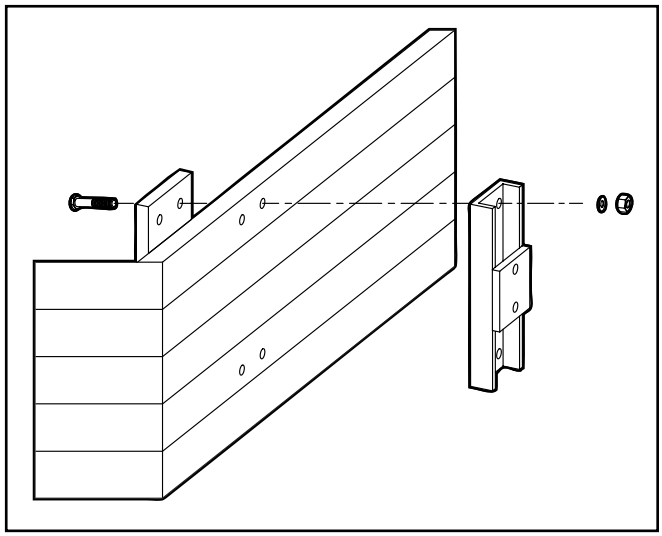




Concrete Bin: Mount steel plate on inside of bin so that the vibrator sits 1/3 up bin side. Isolate the plate from the concrete by using vibration shock absorbers. Consult VIBCO for detailed drawings.

Wood Bin: Use steel plate on inside and bolt to outside mounting channel.

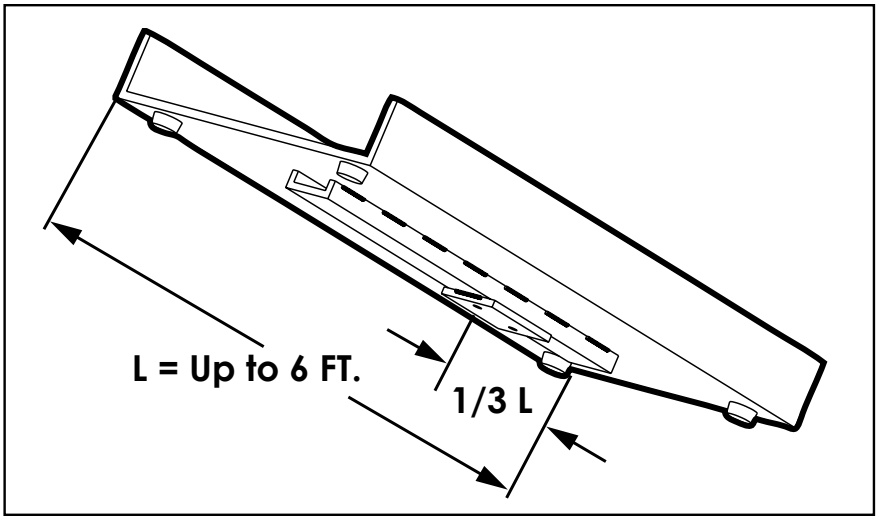




Chutes: In order to successfully move material in a chute, the “angle of repose” of the material has to be known. It can be found in most handbooks or can easily be measured by pouring a cup of the material on a table. The angle between the table and the cone the material makes is the “angle of repose”. To move the material in the chute, it should be inclined no less than 1/2 of the “angle of repose” If this cannot be obtained, a feeder is necessary to move the material.

For optimum performance follow these guidelines:

- Force (impact) needed on vibrator is equal to weight of chute + vibrator + max material in chute.
- Chutes must have an inclination of at least 15° for vibrators to be able to move the material. If inclination is less the chute has to be made into a feeder. Contact VIBCO for selecting the proper size vibrator or ask for the bulletin covering chutes.
- Chutes up to 6 ft. are generally handled by one vibrator mounted approximately 1/3 from the discharge.
- On chutes over 6 ft. long, two vibrators are needed, one should be placed 18 - 24 inches from the discharge. The other approximately in the middle. Since chutes are very sensitive to vibration, provision should be made to move the lower vibrator 6 inches in either direction. This could mean the difference between moving the material or not moving it.



CUSTOM MOUNTING APPLICATIONS

VIBCO’s application specialists can provide general instructions and guidelines for the installation of VIBCO vibrators on customer equipment. These instructions and guidelines are based on the industries best practices and years of experience in applying vibrators. VIBCO specialists are available to review a customer’s individual application to verify installation and make recommendations. These recommendations should not be considered as the Welding Procedure Specifications for the installation.

If Welding Procedure Specifications are required, they should be provided by a professional engineer who is familiar with the structure, the vibrator being mounted, as well as all of the specifications of the materials being used and any of the environmental details present at the application.

For more custom mounting applications call, email or fax.

Installation of the Vibrator

It is now time to put the VIBCO vibrator in place. Make sure that it is secured tightly. Retighten the bolts after the first 10 to 15 minutes of operation and check them periodically to maintain proper tightness (figures 1 and 2).

Damage to the bin and the vibrator can occur if not mounted securely.

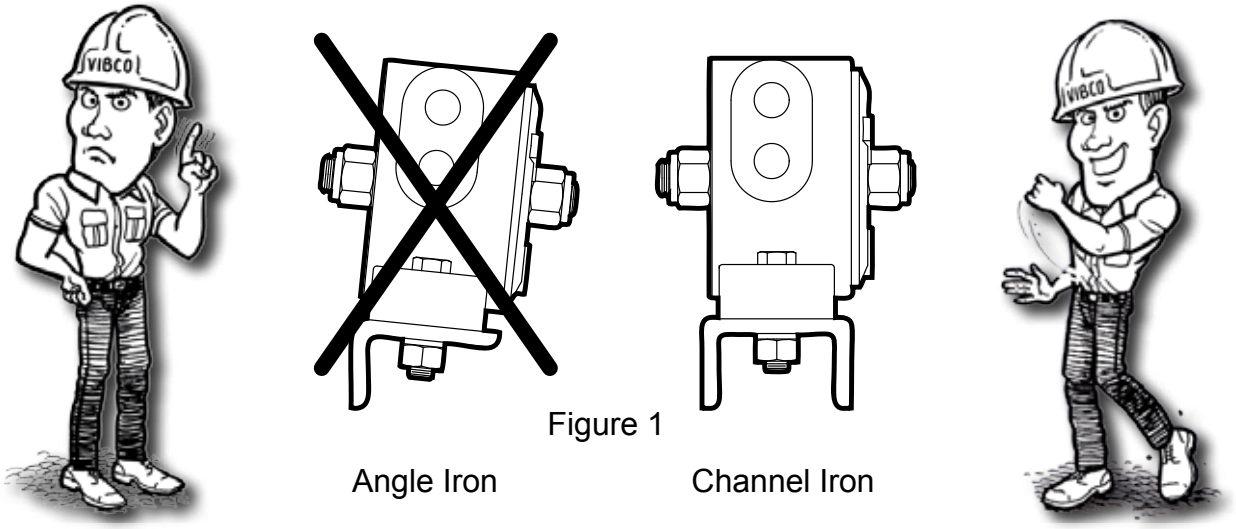


Figure 1

Angle Iron Channel Iron

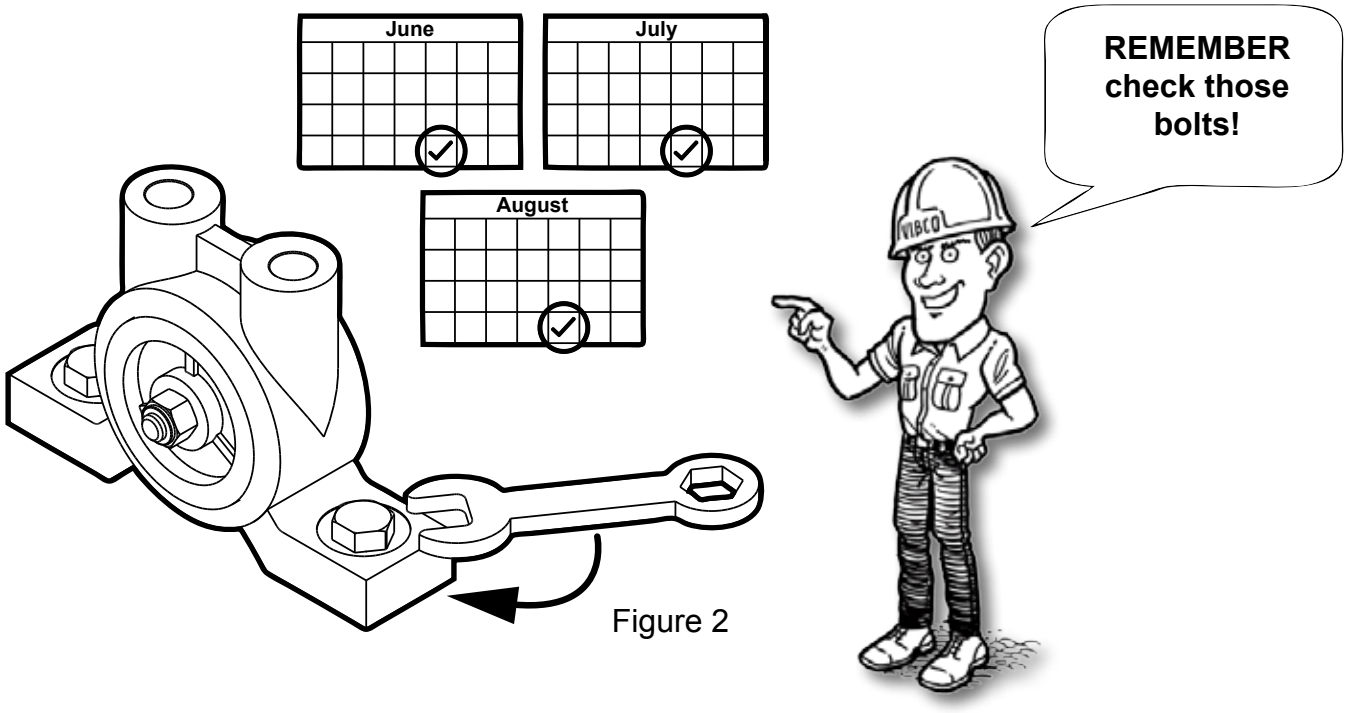


Figure 2

PNEUMATIC HOOK-UP

Air Line To Vibrator

The hose to the inlet port of the vibrator should have the same or larger hose I.D. as the inlet I.D. (pipe size) of the vibrator to minimize pressure loss from the compressor to the vibrator. Check the technical data section of this manual, and find the specifications that meet your model to ensure you have the correct sizes.

TO DETERMINE CORRECT AIR HOSE SIZE**			
BALL MODEL NUMBER	**MIN AIR HOSE DIA**	**MIN FRL* THREAD DIA**	**CFM**
100-130	1/8"	1/4"	4 - 6
160-250	1/4"	1/4"	7 - 10
320-380	3/8"	3/8"	10 - 20

*F=filter R=regulator L=lubricator
**these for installation of single unit;
for multiple units adjust to maintain CFM

Flow Valve

A simple flow control valve is recommended to allow "tuning" the vibrator to the desired force. The air flow determines the force and frequency of the vibrator. By throttling the air flow, you can "find" the desired material discharge rate. Watch for and avoid speeds (frequency) at which the bin wall and the vibrator shake violently. An increase or decrease of air flow usually stops the excessive movement and will smooth out the operation, assuming the mount is rigid.

Quick Opening Valves

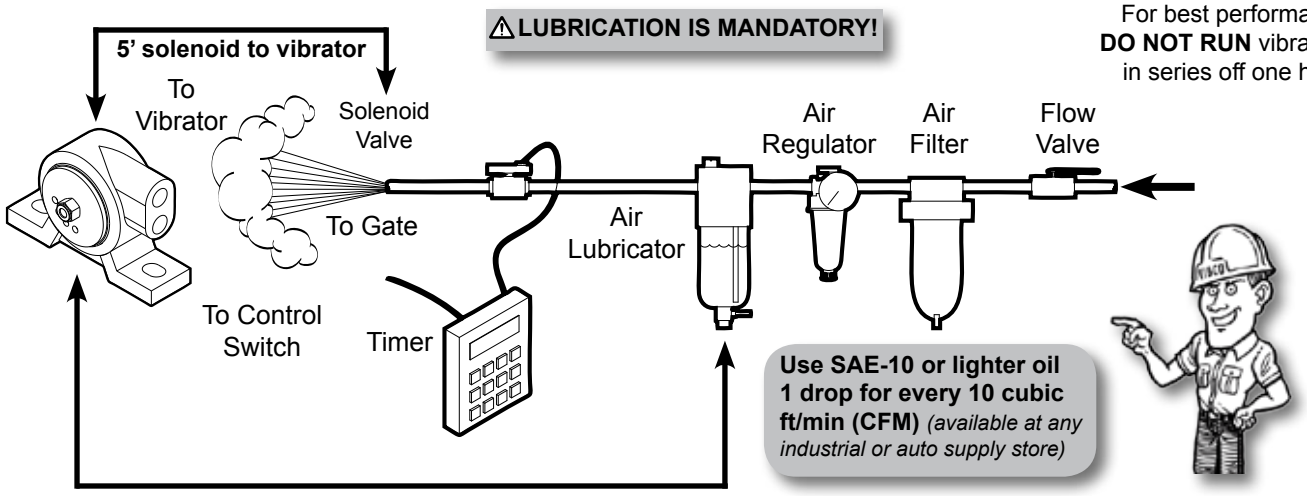
Recommended between the air regulator and the vibrator so the air enters the vibrator at full starting force even with low regulator valve settings. The only requirement is that you install the air regulator at least 12 inches away from the quick opening valve so that the air pressure between the two valves will build up enough to yield the necessary starting force. Solenoid (quick opening) valves are suggested for automatic operations. Automatic Timed Cycling is programmed with the timer usually directly connected to the bin or hopper gate switch. When the gate is opened the timed cycling system is activated.

Air Filter

It is recommended that you use an air filter in the line. Clean air will prolong the life of any pneumatic vibrator. Dirty or moist air will harm the unit and impair it from operating at maximum efficiency and lowest air consumption.

Air Lubricator

Lubrication is required for the smooth operation of the pneumatic ball vibrators. The lubricator should be set at 1 drop for every 10 CFM the vibrator requires. Use SAE-10 oil or lighter.



Maximum Air Pressure
The operating pressure should not exceed 80 psi for models V-190, V-250, V-320, V-380, BV-190, BV-250, BV-320 and BV-380 (Figure 3). The operating pressure should not exceed 60 psi for models BB-100, BB-130, BB-160, BB-190, BV-60, BV-130, V-100 and V-130 (Figure 4).

Maximum Temperature
The operating temperature of the vibrator should not exceed 200°F (93°C). High temperature units are available.

Figure 3

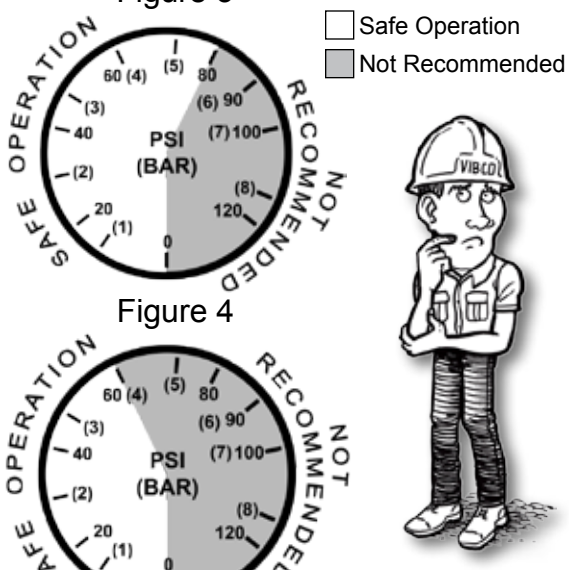
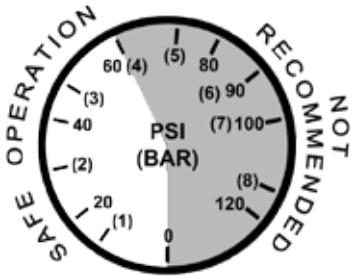
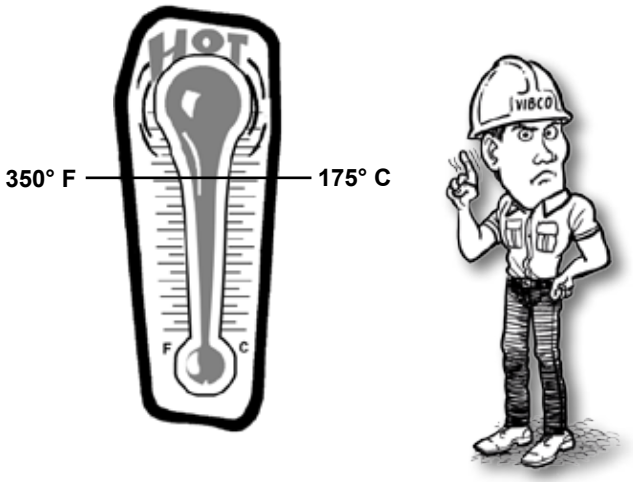


Figure 4





Alternative HIGH TEMP units are available. Consult the factory with your application information for best recommendations.

OPERATING INSTRUCTIONS

To Obtain Maximum Performance
It is not necessary to operate the vibrator at its maximum capacity to obtain maximum performance. Air regulators, timers, etc. should be used to tune the vibrator for optimum performance and ensure longer life.

Continuous vs. Intermittent Operation
For bulk material bin applications, the vibrator should be used to reduce the material friction and increase flow, not as a feeder. Once the friction of the particles is reduced, gravity flow takes over and the vibrator should then be turned off for several reasons:

Economy. Most vibrators are run 60% to 80% longer than they should. Short bursts of vibration are usually more effective than operating continuously. Experience has shown that for most applications, short bursts of 10 to 30 seconds for every 1 to 5 minutes of discharge are more effective and efficient.

Life of the Unit. The life of the vibrator will be determined by the length of operation and the cleanliness of the air supply.

Guaranteed Success of the Application. The vibrator can only furnish material to the discharge area. If more is furnished than conveyed, the remaining material will pack inside the bin. We suggest the vibrators only run when the bin gates or doors are open, or when continuous material flow is needed.

MAINTENANCE

VIBCO ball vibrators require maintenance for optimum performance. They require lubrication in the air line. It is advisable to put both an air-cleaner and an air lubricator in the line to prevent dust and dirt from going through the unit and clogging the muffler as well as keeping the ball and race properly oiled. Use a SAE-10 or light weight tool oil for proper lubrication of a ball vibrator.

IMPORTANT CONSIDERATIONS FOR LONG OPERATING LIFE

Contaminated air will shorten the life of the vibrator considerably, and will clog the race on which the ball runs. It will also increase the wear of the ball, increasing the air consumption and diminishing vibrator efficiency.

Water in the air line will reduce the effectiveness of the lubrication necessary to make the unit operate and lubricate properly.

Water, dirt and air line rust at air pressures over 80 psi will create a sludge similar to grinding compound and will wear down the ball and the race very quickly.

No oil in the air will cause the piston and cylinder walls to wear down rapidly, in some cases less than 8 hours.

In extremely cold applications it is advised to mix antifreeze or kerosene with the oil.

Inject a small quantity of kerosene directly into the vibrator occasionally in order to clean out any accumulated sludge.

Air pressure in excess of 80 psi will increase the velocity of the ball, diminishing the protective oil film and increasing the unit wear.

The Vibrator Won't Start!

1. Check for dirt in the airline OR inlet opening

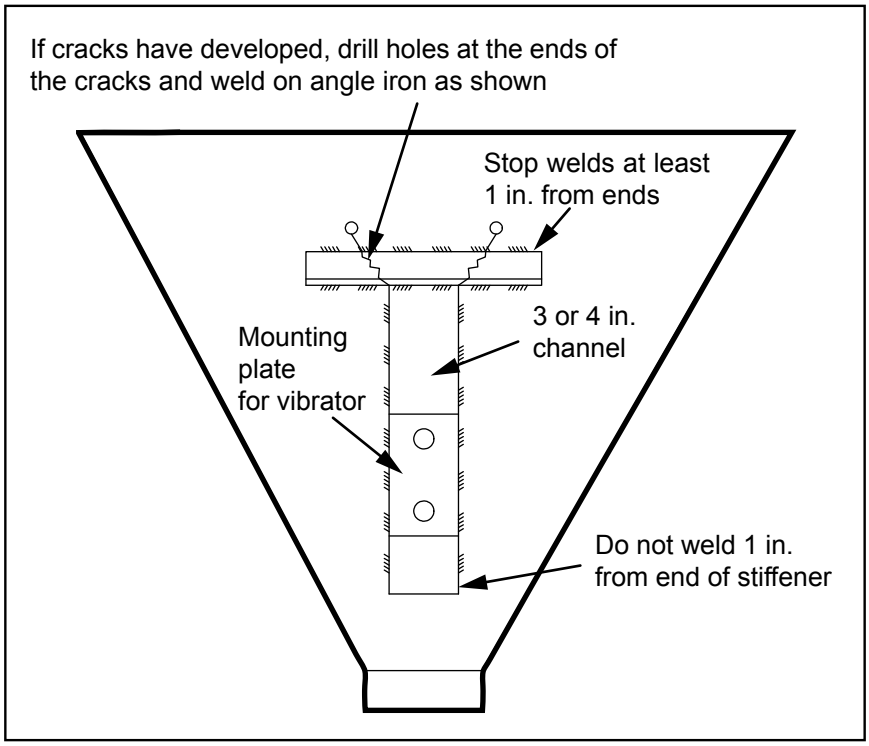
2. Check for dirt or debris clogging the exhaust muffler

3. Double check the size of your air line - is it large enough to give you the correct cubic feet per minute (CFM) and correct air pressure (minimum required = 20 PSI)?

4. Did you mount the air regulator far enough away from the quick acting valve for the right amount of air pressure to build up?

Sudden loss of vibration can be caused by:

Loss of vibration could be caused by a cracked weld or a crack in the bin. Vibration will not travel through a crack. Follow the instructions below on how to fix the problem.

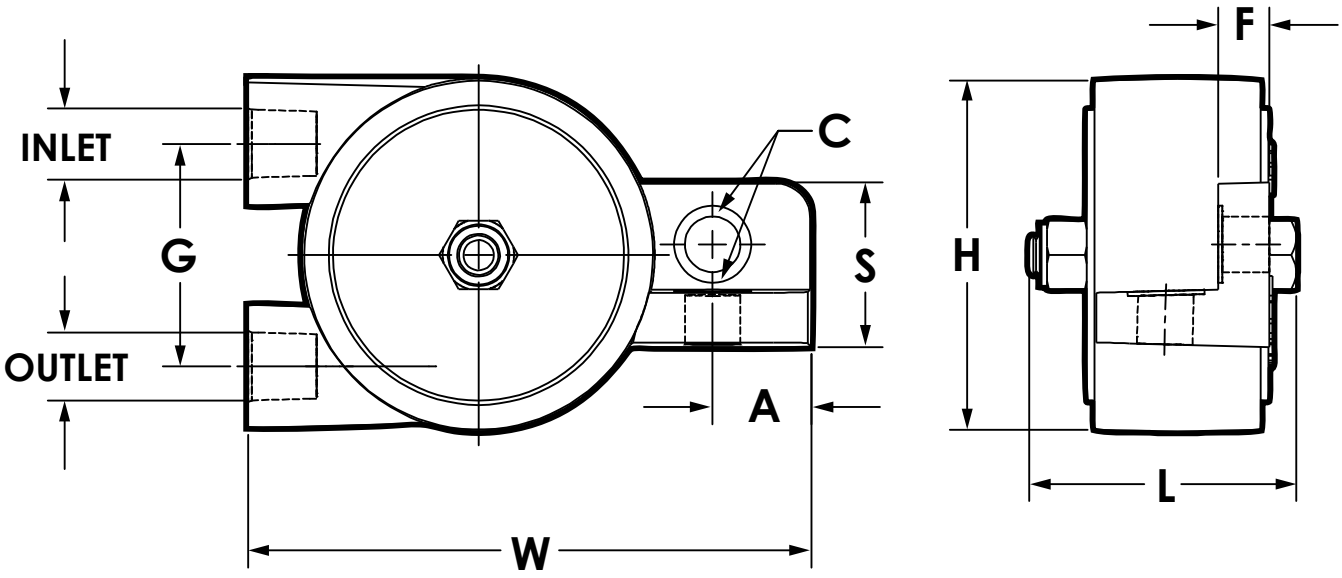

If cracks have developed, drill holes at the ends of the cracks and weld on angle iron as shown
Stop welds at least 1 in. from ends
3 or 4 in. channel
Mounting plate for vibrator
Do not weld 1 in. from end of stiffener

The improper welding of vibrator to bin stiffeners often results in fatigue cracks in the bin. This can be prevented by properly welding stiffeners to the bin side. A stiffener should be skip welded to the bin leaving 3 to 4 inches between welds. STOP WELDS 1 IN. FROM THE ENDS OF THE STIFFENER. This will prevent fatigue cracks that occur due to crystallization of the material. This crystallization is caused by the heat concentration that develops when the ends of the channel iron are welded. To stop the cracks, drill a hole at the end of each crack and weld on a piece of angle iron as shown above. When welding the angle iron STOP WELDS 1 IN. FROM THE ENDS.

MODEL BB DIMENSION AND TECHNICAL DATA

MODEL	A	C*	L	W	H	F	G	S	INLET	OUTLET
	Inch/mm	Inch/mm	Inch/mm	Inch/mm	Inch/mm	Inch/mm	Inch/mm	Inch/mm	NPT	NPT
BB-100	1/2 13	5/16 8	1-9/16 40	3-1/4 83	2 51	5/16 8	1-1/8 29	1 26	1/8	1/8
BB-130	9/16 15	3/8 10	1/15/16 49	3-3/4 96	2-1/4 58	5/16 8	1-1/4 32	1-3/16 31	1/4	1/4
BB-160	5/8 16	3/8 10	2 50	4-1/8 105	2-9/16 66	3/8 10	1-1/2 39	1-1/4 32	1/4	1/4
BB-190	5/8 16	3/8 10	2 50	4-1/8 105	2-9/16 66	3/8 10	1-1/2 39	1-1/4 32	1/4	1/4

*Bolt Size



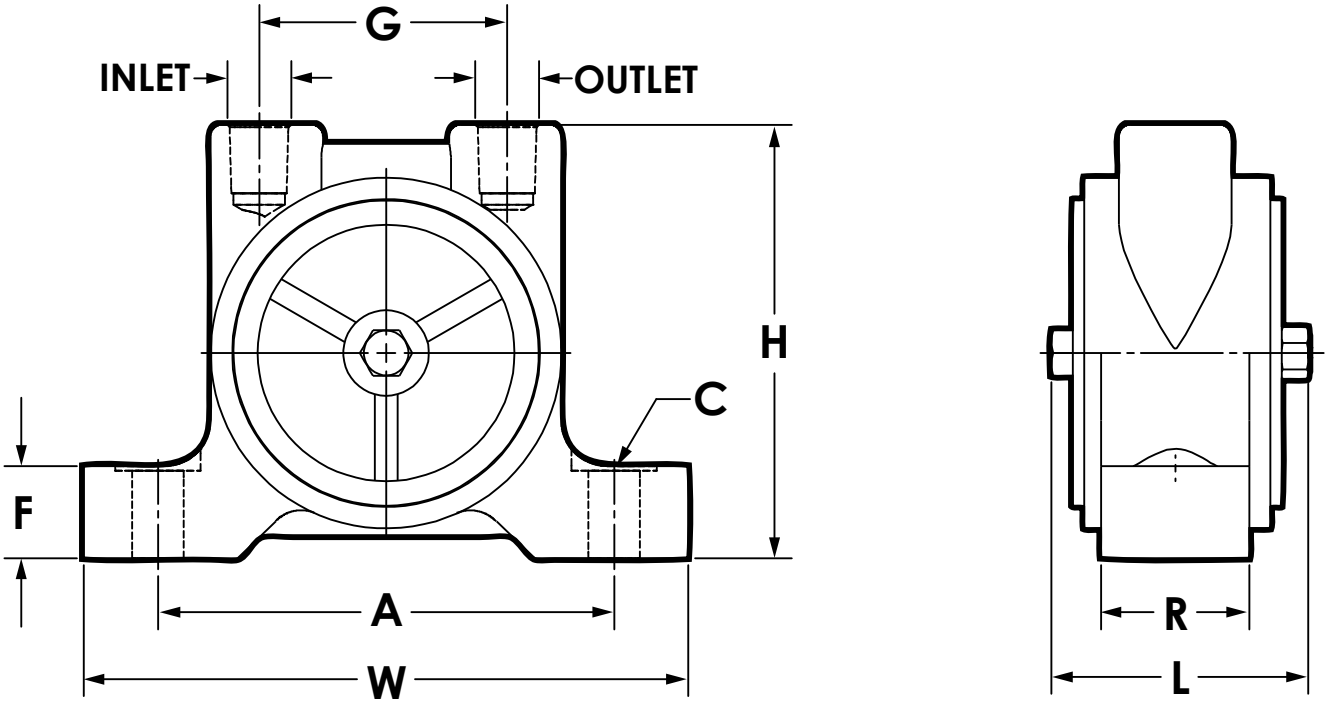
Model	Weight		20 PSI		40 PSI		60 PSI		Force		dB*	Max Lbs **
	oz	kg	VPM	CFM	VPM	CFM	VPM	CFM	lbs	N		Material in Bin
BB-100	8	0.227	17000	2	20000	4	24000	6	55	245	75	550
BB-130	10	0.283	12000	2.5	15000	5	19000	7.5	80	356	72	800
BB-160	16	0.454	11000	3	13000	6	15000	8	140	623	76	1400
BB-190	18	0.510	10000	4	12000	7	15500	11	250	1112	77	2500

Data obtained on laboratory test block. Frequency and force will decrease on less rigid mount.
*Decibel from A-Scale at 1m.
**Rule of thumb for sizing “1 lb vibratory force to each 10 lbs of bin content”.
NOTE: Dimensions and data subject to change without notice.

MODEL BV DIMENSIONS AND TECHNICAL DATA

Model	A Inch/mm	C* Inch/mm	L Inch/mm	W Inch/mm	H Inch/mm	F Inch/mm	G Inch/mm	R Inch/mm	INLET NPT	OUTLET NPT
BV-60	3 77	1/4 7	1-11/16 43	3-7/8 99	2-1/2 64	5/8 16	1-1/4 32	3/4 20	1/8	1/8
BV-130	4 102	3/8 10	1-15/16 49	4-7/8 124	2-3/4 70	3/4 20	1-7/19 37	7/8 23	1/8	1/4
BV-190	4 102	3/8 10	2-1/4 58	5-1/2 140	3-9/16 90	9/16 15	1-7/8 48	1-1/4 32	1/4	1/4
BV-250	5 128	1/2 13	2-7/16 62	6-3/4 172	3-15/16 100	7/8 23	2-3/16 56	1-5/16 33	1/4	1/4
BV-320	5 128	1/2 13	2-3/4 70	6-11/16 170	4-7/8 124	1-1/8 29	2-3/4 70	1-5/8 42	3/8	3/8
BV-380	6 153	5/8 16	2-15/16 75	7-7/8 201	5-3/4 147	1-1/8 29	2-13/16 72	2 51	3/8	3/8

*Bolt Size



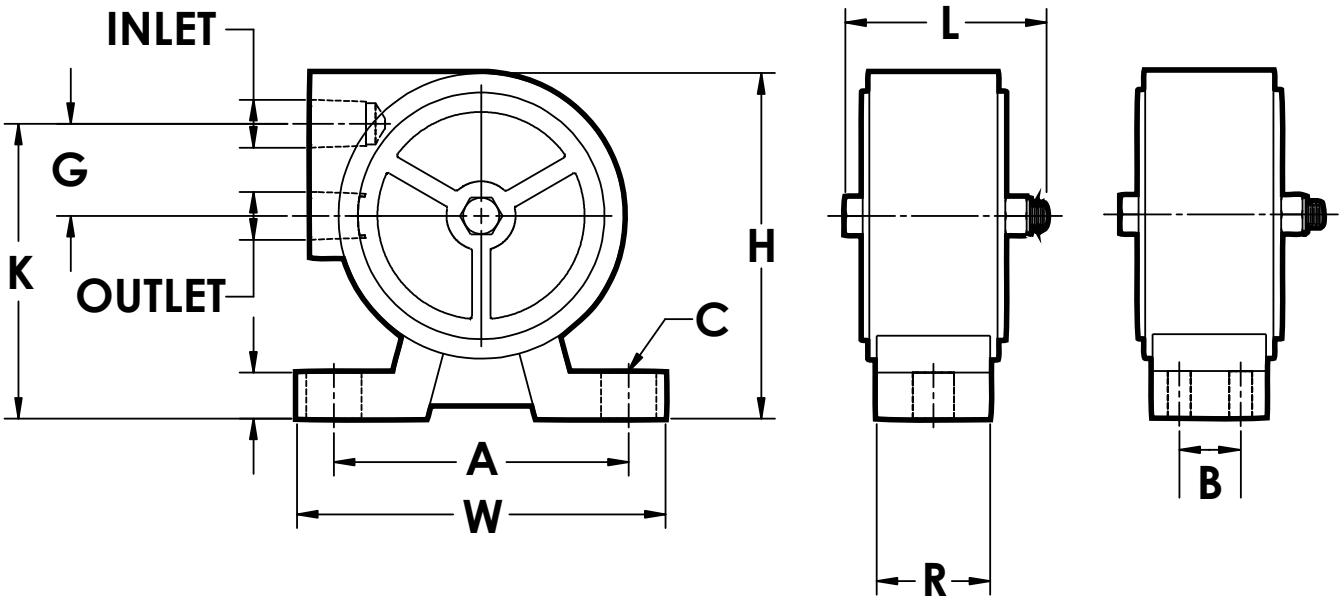
Model	Weight oz/lbs	Weight kg	20 PSI VPM	20 PSI CFM	40 PSI VPM	40 PSI CFM	60 PSI VPM	60 PSI CFM	80 PSI VPM	80 PSI CFM	Force lbs	Force N	dB	Max Lbs. ** Material in Bin
BV-60	8 oz	0.227	17000	2	20000	4	24000	6	-		55	245	75	550
BV-130	11 oz	0.312	12000	2.5	15000	5	19000	7.5	-		80	356	76	800
BV-190	24 oz	0.689	-		12000	10	14000	11	16000	11	260	1157	77	2600
BV-250	2.8 lbs	1.3	-		9200	8	10500	11	11000	13	380	1691	79	3800
BV-320	4.8 lbs	2.2	-		6500	9	7500	14	8400	17	480	2136	80	4800
BV-380	6.2 lbs	2.8	-		5500	10	6200	15	6500	20	600	2669	82	6000

Data obtained on laboratory test block. Frequency and force will decrease on less rigid mount.
*Decibel from A-Scale at 1m.
**Rule of thumb for sizing “1 lb vibratory force to each 10 lbs of bin content”.
NOTE: Dimensions and data subject to change without notice.

MODEL V DIMENSIONS AND TECHNICAL DATA

Model	A	B	C*	L	W	H	G	K	R	INLET	OUTLET
	inch/mm	inch/mm	inch/mm	inch/mm	inch/mm	inch/mm	inch/mm	inch/mm	inch/mm	NPT	NPT
V-100	3 77	-	1/4 7	1-11/16 43	3-7/8 99	2 51	11/16 18	-	3/4 20	1/8	1/8
V-130	4 102	-	3/8 10	1-15/16 49	4-7/8 124	2-5/16 59	11/16 17	-	15/16 24	1/8	1/8
V-190	4 102	-	3/8 10	2-3/16 56	5-1/16 129	3-3/16 81	7/8 23	2-5/8 67	1-5/16 34	1/4	1/4
V-250	4 102	-	1/2 13	2-7/16 62	5-9/16 142	3-1/2 89	1-1/16 27	2-15/16 75	1-1/2 39	1/4	1/4
V-320	4 102	-	1/2 13	2-3/4 70	5-9/16 142	4-7/8 124	1-3/8 35	4-1/8 105	1-1/2 39	3/8	3/8
V-380	5-1/2 140	1-1/4 32	3/8 10	2-15/16 75	6-7/8 175	4-7/8 124	1-3/8 35	3-7/8 99	2-3/8 61	3/8	3/8

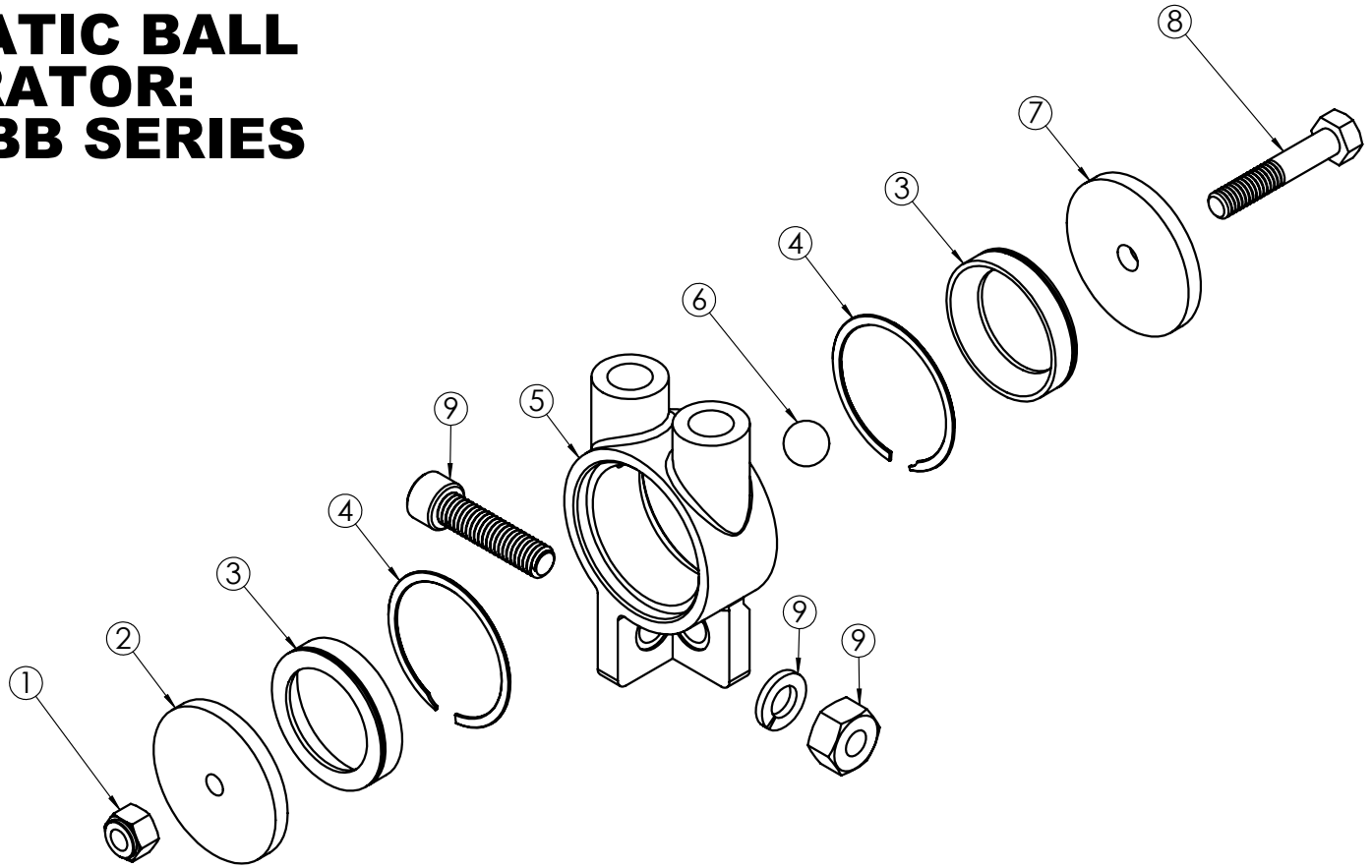
*Bolt Size



Model	Weight		20 PSI		40 PSI		60 PSI		80 PSI		Force		dB*	Max Lbs**
	oz/lbs	kg	VPM	CFM	VPM	CFM	VPM	CFM	VPM	CFM	lbs	N		Material in Bin
V-100	8 oz	0.227	18000	4	20000	6	24000	6	-		55	245	75	550
V-130	11 oz	0.312	10000	4	15000	5	19000	7.5	-		80	356	72	800
V-190	26 oz	0.737	-		12000	6	14000	10	16000	11	260	1157	73	2600
V-250	2.6 lbs	1.2	-		9200	8	10500	11	11000	13	380	1691	72	3800
V-320	4.6 lbs	2.1	-		7500	12	8900	14	10000	17	650	2892	78	6500
V-380	6.2 lbs	2.8	-		5500	10	6200	15	6500	20	600	2669	78	6000

Data obtained on laboratory test block. Frequency and force will decrease on less rigid mount.
*Decibel from A-Scale at 1m.
**Rule of thumb for sizing “1 lb vibratory force to each 10 lbs of bin content”.
NOTE: Dimensions and data subject to change without notice.

PNEUMATIC BALL VIBRATOR: MODEL BB SERIES



BB SERIES PARTS LIST									
	1	2	3	4	5	6	7	8	9
	HEX NUT	TAPPED COVER	RETAINING RING	BALL RACE	HOUSING	STEEL BALL	COVER	SCREW	MOUNTING HARDWARE
BB-100	5/16-18HN	100BBS04-2	US143	100BL02	100BBS05-1	3/8B	100BBS04-1	5/16-18X1-1/2HH	SET-01
BB-130	5/16-18LN	130BBS04-2	US168	130BL02	130BBS06-1	1/2B	130BBS04-1	5/16-18X1-3/4HH	SET-02
BB-160	5/16-18LN	160BBS04-2	US193	160BL02	160BBS05-1	5/8B	160BBS04-1	5/16-18X1-3/4HH	SET-02
BB-190	5/16-18LN	160BBS04-2	US193	160BL02	160BBS05-7	11/16B	160BBS04-1	5/16-18X1-3/4HH	SET-02
QTY.	1	1	2	2	1	1	1	1	1

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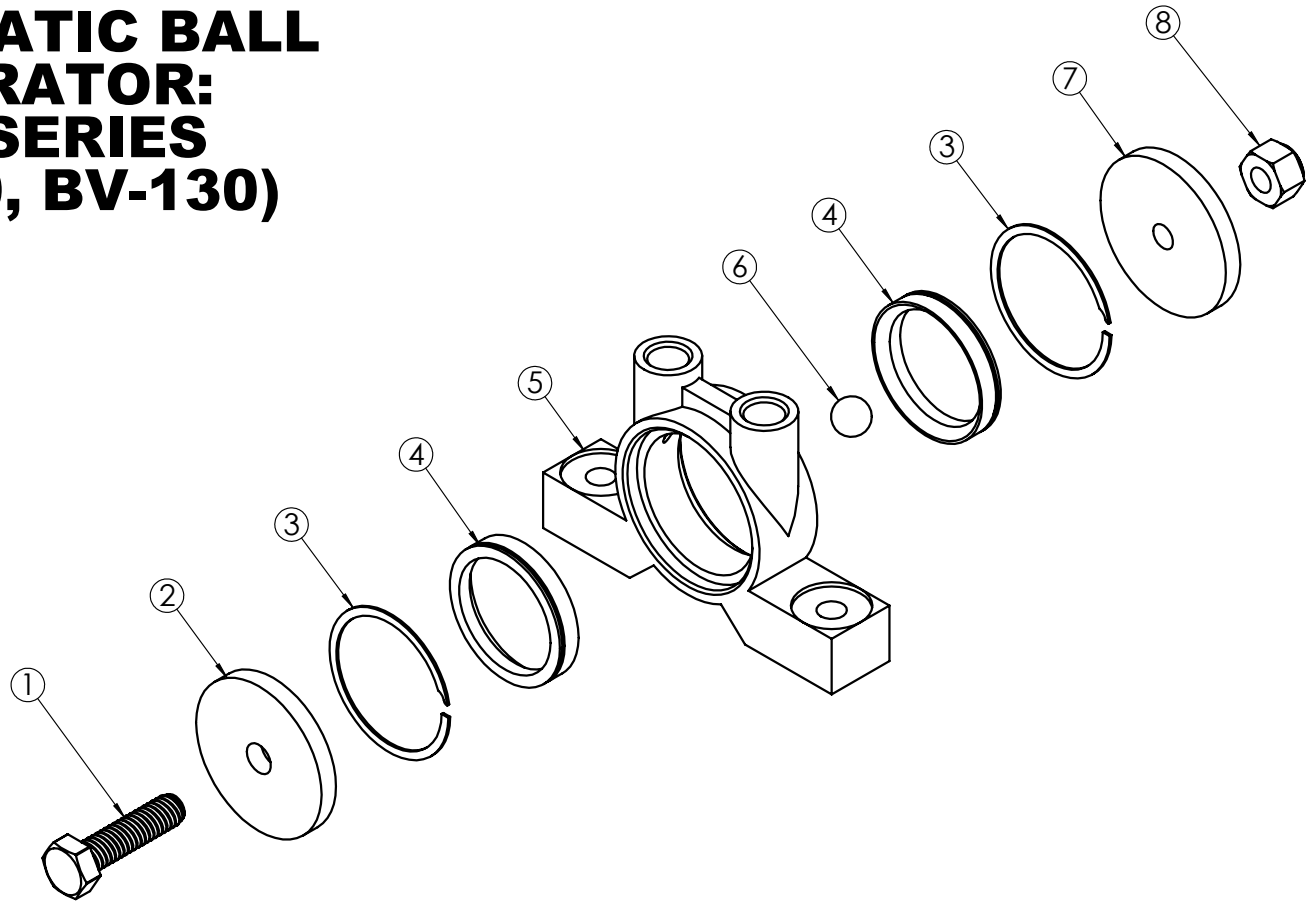
PNEUMATIC BALL VIBRATOR: BV SERIES (BV-60, BV-130)



BV SERIES PARTS LIST								
	1	2	3	4	5	6	7	8
	SCREW	COVER	RETAINING RING	BALL RACE	HOUSING	STEEL BALL	TAPPED COVER	LOCKNUT
BV-60	5/16-18X1-1/4HH	100BBS04-1	US143	100BL02	60BVS02-1	3/8B	100BBS04-2	5/16-18LN
BV-130	5/16-18X1-3/4HH	130BBS04-1	US168	130BL02	130BVS02-1	1/2B	130BBS04-2	5/16-18LN
QTY.	1	1	2	2	1	1	1	1

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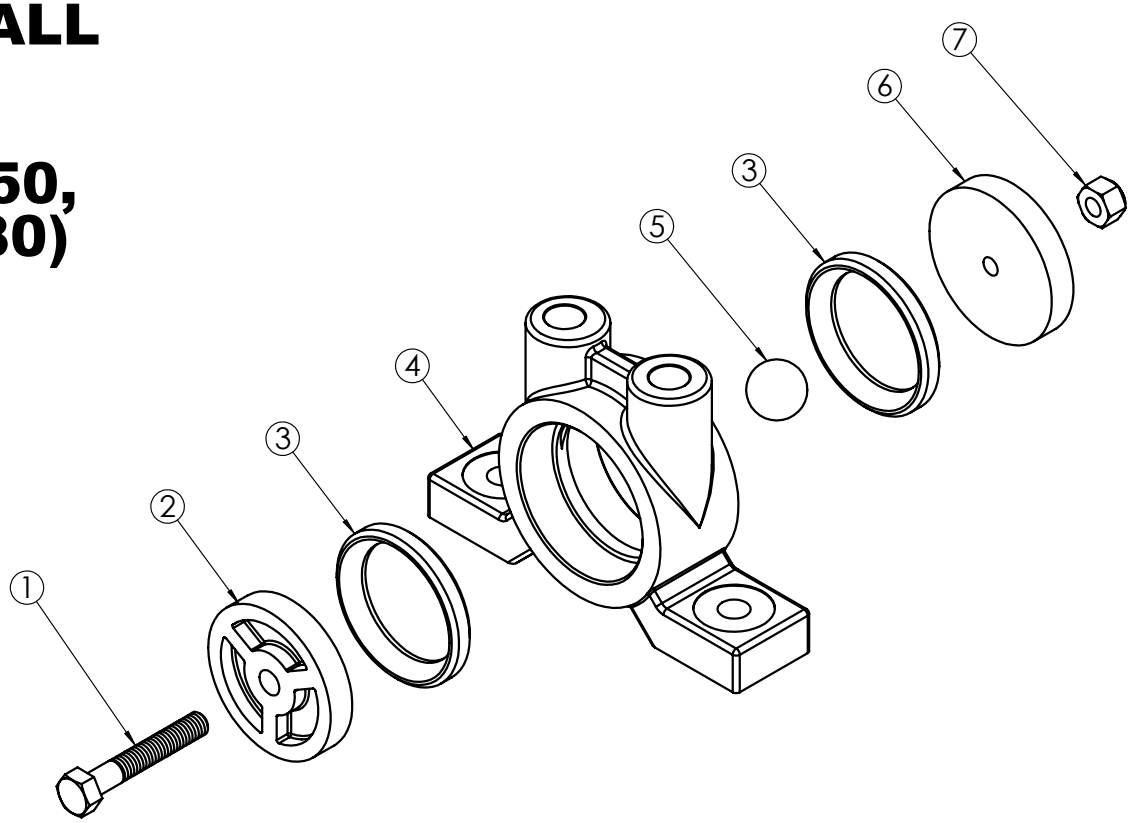
PNEUMATIC BALL VIBRATOR: BV SERIES (BV-190, BV-250, BV-320, BV-380)



BV SERIES PARTS LIST							
	1	2	3	4	5	6	7
	SCREW	REAMED COVER	BALL RACE	HOUSING	STEEL BALL	TAPPED COVER	LOCKNUT
BV-190	5/16-18X2HH	190BL17-2	190BL09	190BL20	3/4B	190BL17-3	5/16-18LN
BV-250	5/16-18X2-1/4HH	250BL17-2	250BL08	250BL19	1B	250BL17-3	5/16-18LN
BV-320	5/16-18X2-1/2HH	320BL25-2	320BL19	320BL30	1-1/8B	320BL25-3	5/16-18LN
BV-380	5/16-18X2-3/4HH	380BL23-2	380BL19	380BL25	1-1/4B	380BL23-3	5/16-18LN
QTY.	1	1	2	1	1	1	1

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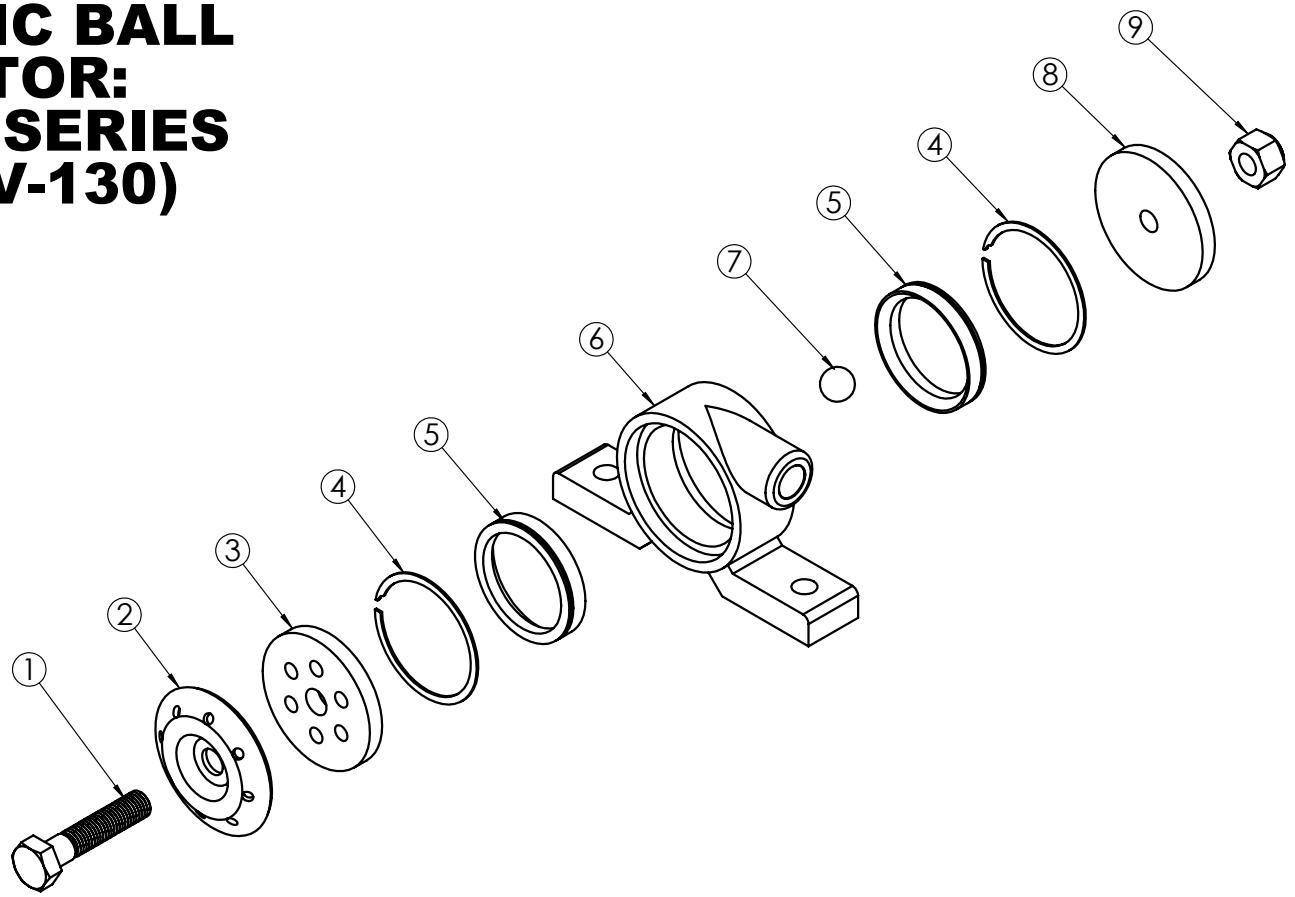
PNEUMATIC BALL VIBRATOR: MODEL V SERIES (V-100, V-130)



V SERIES PARTS LIST									
	1	2	3	4	5	6	7	8	9
	SCREW	FORMED COVER	EXHAUST COVER	RETAINING RING	BALL RACE	HOUSING	STEEL BALL	TAPPED COVER	LOCKNUT
V-100	5/16-18X1-1/2HH	100BBS23-4	100BBS07	US143	100BL02	100BL04-1	3/8B	100BBS04-2	5/16-18LN
V-130	5/16-18X1-3/4HH	100BBS23-5	130BBS09	US168	130BL02	130BL04-1	1/2B	130BBS04-2	5/16-18LN
QTY.	1	1	1	2	2	1	1	1	1

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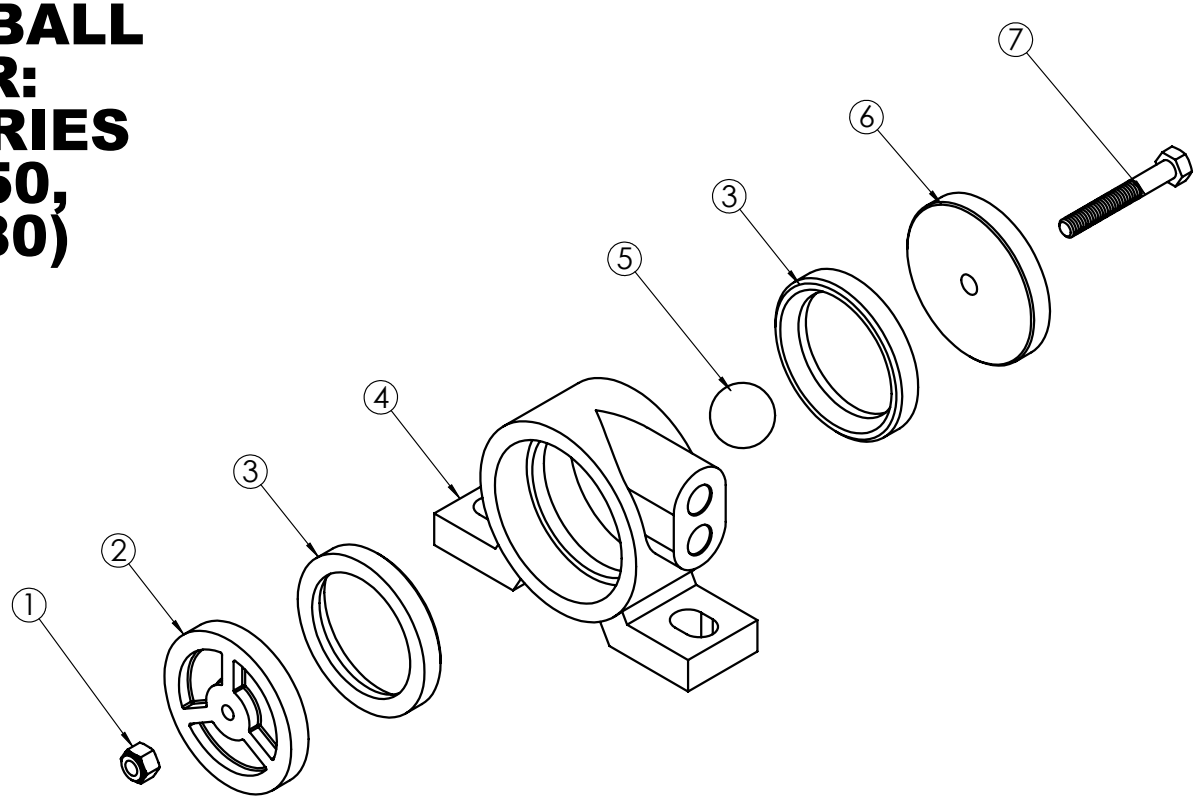
PNEUMATIC BALL VIBRATOR: MODEL V SERIES (V-190, V-250, V-320, V-380)



V SERIES PARTS LIST							
	1	2	3	4	5	6	7
	LOCKNUT	TAPPED COVER	BALL RACE	STEEL BALL	HOUSING	REAMED COVER	SCREW
V-190	5/16-18LN	190BL17-3	190BL09	3/4B	190BL15	190BL17-2	5/16-18X2HH
V-250	5/16-18LN	250BL17-3	250BL08	1B	250BL15	250BL17-2	5/16-18X2-1/4HH
V-320	5/16-18LN	320BL25-3	320BL19	1-1/8B	320BL23	320BL25-2	5/16-18X2-1/2HH
V-380	5/16-18LN	380BL23-3	380BL19	1-1/4B	380BL17	380BL23-2	5/16-18X1-3/4HH
QTY.	1	1	2	1	1	1	1

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WARRANTY AND GENERAL INFORMATION

Warranty
All warranty claims must be submitted to VIBCO for approval prior to any repairs being done. Failure to do so will void any and all warranty coverage.

Errors, Shortages and Complaints
Complaints concerning goods received or errors should be made at once. Claims must be made within five days after receipt of goods. Clerical errors are subject to correction.

Returning Parts
Parts should not be returned to VIBCO without prior authorization. Call VIBCO's customer service department at 800-633-0032 (800-465-9709 in Canada) for a Return Goods Authorization (RGA) number. A return authorization will be faxed to you. Return shipping must be prepaid. Material returned may be subject to a 10% restocking fee. All returned shipments should clearly display your name, address and original invoice number to ensure proper credit.

Orders for equipment built to specifications which vary from VIBCO's standard units are not returnable.

Responsibility
VIBCO cannot be responsible for delays due to strikes, accidents, negligence of carriers or other causes beyond our control.

Freight Claims
Should you receive a shipment from VIBCO which was damaged in transit, file your claim with the carrier immediately. All parts sold by VIBCO are on the basis of F.O.B. Wyoming, Rhode Island.

Product Changes
VIBCO reserves the right to make changes in pattern, design or materials when deemed necessary, without prior notice or obligation to make corresponding changes in previous models.

Price Changes
Prices are subject to change without notice.

Ordering Spare Parts
Parts can be ordered through authorized distributors or directly from VIBCO. The following data should be provided when ordering:

From foot of housing:	Model of unit.
From spare parts list:	Reference number, part number, description and quantity required.
Shipping instructions:	Specify shipping point and method of shipping.

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